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MEMORANDUM

To: EPA/LWG Ecorisk Team
From: Lisa Saban, Helle Andersen, Mike Johns, Lorraine Read, Teresa Michelsen
Subject: Summary of November 21, 2005 Benthic Meeting
Date: December 6, 2005

Attendants in person or on the phone: Jay Field, Teresa Michelsen, Lorraine Read, Mike Johns, Lisa Saban, Rick Applegate, Rob Pastorok, Nancy Musgrove, Joe Goulet, Jennifer Peterson, Mike Anderson, Ben Shore, Taku Fuji, Chris Thomson, Helle Andersen.

Hand-outs: Interpretive maps of chemistry and bioassay data based on no-hit designations and the Floating Percentile Model. Outline of the Benthic Interpretive Report. [I didn't receive an outline of the benthic interpretive approach. If this was the presentation, it went too fast to comment on, and I did not get an electronic copy after the fact. They should submit this, though.](#)

Short summary of meeting agenda:

- The meeting started out with presentations of the Logistic Regression Model by Lorraine Read and the Floating Percentile Model by Teresa Michelsen. As an introduction to the two models Helle Andersen gave a short presentation of manipulation and reduction of the chemical data which was done before the work with the models were initiated. [It would be good to have this summary written down somewhere because am still not clear on all they did to manipulate and reduce the chemical data, and if it was appropriate.](#)
- After the presentations the letter from EPA regarding the benthic interpretive approach (October 26, 2005) was discussed by going over each of the main issues listed in the letter.
- Lorraine Read presented her findings with the Logistic Regression Model and other analyses (scatter plots and more) she had performed on the data.

- Jay Field gave a presentation on his findings with the Logistic Regression Model and pointed out issues including the good correlation between % fines and toxicity that need further discussion and evaluation. The interpretation of this finding from a chemistry benthic risk will need to be discussed within the risk assessment/risk management framework.
- The interpretive maps of chemistry and bioassay data based on no-hit designations and the Floating Percentile Model were discussed including an approach that used the data to screen out the areas showing no toxicity.
- At the end of the day Mike Anderson gave a summary of his findings while working with the Floating Percentile Model. Mike discussed some of the problems with the model, some of which still need to be resolved. Teresa's responses to his detailed memo were not received prior to the meeting, but were handed to him in hard copy at the meeting. He is going over this info and will respond.
- The team is finding a link between conventional parameters and toxicity response-both teams will investigate this further.

Agreements reached concerning issues raised in the EPA letter regarding the interpretive report:

- The Logistic Regression Model will use pooled endpoints both by species (*Hyalella* growth and mortality, and *Chironomus* growth and mortality) and an overall pooled endpoint (*Hyalella* and *Chironomus* growth and mortality). Questions were raised regarding the appropriateness of pooling when one or more individual endpoints did not have a good model fit. The benthic report will explore this evaluation in more detail (pooling vs non-pooling).
- The Floating Percentile Model will use three individual endpoints. One of the four endpoints (*Hyalella* growth) will most likely not be included in the model due to poor performance. The poor performance will be discussed in the benthic interpretive report (see action items). A section will be included in the benthic interpretive report discussing the effect of using pooled endpoints similar to the Logistic Regression Model and provide examples of the results. However, because the model gives better results using each endpoint individually, the final model run will be completed using the three individual endpoints. To address the effects of pooling the endpoints, maps will be provided showing the outcome of the three separate endpoints in a pooled format (probably in a "pie chart per station" format). They presented this as a proposal at the meeting, but I wasn't aware we agreed to it. I would recommend including *Hyalella* growth as an endpoint in the report (pooled endpoints both by species and overall). We can then make a decision on how to interpret the results. They seem to want to

evaluate each endpoint separately, which we have some problems with (e.g. between there may be some confounding effects between in growth where there is high mortality). I guess this is fine as long as they also evaluate pooled endpoints between species and overall pooled (*Hyalella* and *Chironomus* growth and mortality).

- Control-normalization was found to be a minor issue. The growth endpoints were already normalized as outlined in the Benthic Approach memo. The control performance for the mortality endpoint was very good in all the bioassays and the normalization process would therefore not make much difference. Because the issue was raised by EPA late in the process, it was agreed that in the effort of not losing time and effort already spent, the control-normalization would not be done for the mortality endpoint. We asked for control normalization in our memo, and it would be better to do it this way. They resisted, and we approved? Anyway, it may make a difference for those samples at the low tox end (maybe those that were not stat. distinguishable). Therefore, if they don't want to do it they should show that it does, in fact, not make a difference by presenting it both ways. That way we can agree with their analysis.
- The interpretive report will include three hit/no-hit toxicity thresholds (level 1, 2, and 3).

For the Logistic Regression Model these will be:

- 1) <90% control-normalized growth and survival
- 2) <80% control-normalized growth and survival
- 3) <70% control-normalized growth and survival

For the Floating Percentile Model these will be:

- 1) <90% survival or <90% control-normalized growth (if they can go back and add this one in, then why can't they do the 70 and the 80 as well?) I am not sure with the FPM that adding an additional level at the lowest end is more beneficial than looking at slicing the magnitude of toxicity up at the 20 and 30 area where you would see more effects (esp. those moderate in nature).
- 2) SQS definitions (see benthic approach memo)
- 3) CSL definitions (see benthic approach memo)

The thresholds for the Logistic Regression Model were selected to parallel the work Jay Field is doing with the data, whereas the thresholds for the Floating Percentile Model were selected to follow regional guidelines. I wasn't under the impression we agreed to do this for sure, we agreed Mike Anderson would do the analysis. As for what threshold level we would select has yet to be determined. The work that has been done to date with the two sets of thresholds

shows that there is not much difference in the outcome of the two models. A section in the interpretive report will summarize the differences.

- A list of chemicals detected in sediment but not included in the models will be provided in the interpretive report. The chemicals excluded from the models were based on less than 30 detected concentrations. In the discussion Jay Field pointed out that he uses a cut-off value of less than 100 detected concentrations.
- The interpretive report will include a definition of the "N" qualifier and a summary statement regarding how many data points were excluded because of this qualifier. *We should internally have a position on if it is appropriate to exclude "N" qualified data. This is for contaminants where there was presumptive evidence for an analyte, and for metals the analysis was not in control limits. For organics this was where the analyte exhibited low spectral parameters. What does this mean? Does anyone understand this qualifier.*

Action items:

- Both teams will plot the stations where TPH was analyzed to verify that the stations were selected based on sources.
- More work will be done to evaluate the effects of grain size. Teresa Michelsen will combine the *Hyalella* growth endpoint with percent fines and see if this improves the performance of this endpoint. If the endpoint is improved, it will be included in the model and the benthic interpretive report. *It should be included regardless.*
- Porewater ammonia data from the bioassay should be compared with the ammonia concentrations measured in the bulk sediment to evaluate if there is any correlation.
- Teresa Michelsen and Mike Anderson will continue working together on issues related to the Floating Percentile Model.
- The benthic interpretive report will be submitted to EPA in early February, 2006.
- A phone conference meeting may be held prior to submittal of the benthic interpretive report to discuss any issues that may come up during the final runs of the two models.